

CLAIMS

1. A data communication system comprising a transceiver unit for retromodulated optical communication with at least one of a plurality of retromodulator units, the transceiver unit comprising at least one of a plurality of transceivers, the transceivers transmitting diffused radiant energy at different angles covering a predetermined three-dimensional area, wherein each transceiver is enabled to set up and execute communication with at least one retromodulator unit located within its coverage area.
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- 10 2. The system of claim 1 where the coverage areas are contiguous.
3. The system of claim 2 where the coverage areas overlap.
4. The system of claim 1 wherein each transceiver is further enabled to maintain continuous communication with a retromodulator unit that moves between coverage areas.
- 15 5. The system of claim 1 further comprising at least one of a plurality of retromodulator units, where the retromodulator unit comprises multiple arrays of lenslets connected to a common modulator and reflector.
- 20 6. The system of claim 1 where the retromodulator unit comprises a spherical arrangement of lenslets connected to a common modulator and reflector.
7. The system of claim 5 or claim 6 where the retromodulator unit is provided with an interface for communication with a data processing device.
- 25 8. The system of claim 1 further comprising at least one of a plurality of retromodulator units, where the retromodulator unit comprises two or

more parts, each part comprising a narrow band-pass optical filter and a modulator, each part communicating with a separate segment of the transceiver unit.

9. The system of claim 1, wherein the transceiver unit is configured to

5 transmit low level radiation until detection of a retromodulator unit, whereupon the radiation level is increased in the transceiver covering the predetermined three-dimensional area in which the detected retromodulator unit is located.

10. The system of claim 9 where detection of the retromodulator unit is

10 triggered by retroreflected radiation from the retromodulator unit received by the transceiver unit.

11. The system of claim 9 where detection of the retromodulator unit is

triggered by retromodulated radiation from the retromodulator unit received by the transceiver unit.

15 12. The system of claim 1 where the radiant energy is transmitted and received via an optical fiber.

13. The system of claim 1 where the radiant energy is modulated at a high frequency.

14. The system of claim 1 wherein the retromodulator unit is integrated

20 into a remote control and communicates control data to the transceiver unit, which is integrated into a device controlled by the remote control.

15. The system of claim 14 where the remote control further comprises one or more photovoltaic cells.

25 16. The system of claim 15 where the remote control further comprises a battery charger.

17. The system of claim 1 wherein the retromodulator unit is integrated into an electronic remote identification card and the transceiver unit is implemented in an access control point.
18. The system of claim 17 further comprising analyzing components for comparing biometric information permanently stored in the card with real-time biometric information obtained from the card owner.
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19. The system of claim 18 where the real-time biometric information obtained from the card owner is sent to the transceiver unit via the retromodulator.
- 10 20. The system of claim 1 wherein the retromodulator unit is integrated into a micro aerial vehicle and the transceiver unit is a data collection station.
21. The system of claim 1 wherein the transceiver unit is integrated into a micro aerial vehicle and the retromodulator unit is a remote sensor.
- 15 22. The system of claim 12 where the transceiver unit is integrated into a data collection station and the retromodulator unit is a remote sensor.
23. The system of claim 22 where the remote sensors are installed internally along the length of a pipe.
23. The system of claim 12 where the transceiver unit is integrated into a data collection station and the retromodulator unit is a remote sensor that detects intruders.
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24. The system of claim 1 where the transceiver unit is integrated into a photographic printing service and the retromodulator unit is integrated into a camera.
- 25 25. The system of claim 1 where the transceiver unit is integrated into a personal computer and the retromodulator unit is integrated into a camera.

26. The system of claim 1 where the transceiver unit is integrated into a media system and the retromodulator unit is integrated into remote identification tag.

5 27. A method for retromodulated data communication, the method comprising:

providing a transceiver unit comprising at least one of a plurality of transceivers;

10 transmitting diffused radiant energy through the transceivers at different angles covering a predetermined three-dimensional area;

15 setting up communication between a transceiver and a retromodulator unit located within the coverage area of that transceiver;

executing the communication between the transceiver and the retromodulator unit.

28. The method of claim 27 where setting up communication comprises:

a retromodulator in a transceiver's area of coverage retroreflecting the radiant energy;

20 the transceiver responding to the retroreflection by increasing the power of the radiant energy;

the retromodulator responding to the higher power by initiating data modulation of the radiant energy.

29. The method of claim 27 where setting up communication comprises:

25 a retromodulator in a transceiver's area of coverage retromodulating the radiant energy with an initial handshake signal;

the transceiver responding to the retromodulation by increasing the power of the radiant energy;

the retromodulator responding to the higher power by initiating data modulation of the radiant energy.